Leukaemias/Malignancies

Diffuse large B cell lymphoma

Clinical information and laboratory results

A 68-year-old patient with a main complaint of confusion and lethargy was admitted to the ICU. Haematology lab results revealed anaemia (HGB 6.8 g/dL / 4.2 mmol/L), leucocytosis (WBC 17.24 × 10^3/µL), and thrombocytopenia (PLT&F 56 × 10^3/µL), as well as an abnormal white blood cell differential.

Fig. 1 Haematology analysis results displayed by the XR IPU.

The blood smear showed abnormal blast-like looking lymphocytes, some of which had a cleft nucleus. Subsequent immunophenotyping results confirmed a suspected diagnosis of diffuse large B cell lymphoma.

Additionally, the patient developed an infection with *Streptococcus parasanguinis,* which was confirmed by a blood culture.

Result interpretation

Diffuse large B cell lymphoma (DLBCL) typically presents with abnormal lymphocytes that have large nuclei, basophilic cytoplasm and a high proliferation rate [1]. Abnormal lymphocytes have certain characteristics that make it possible to differentiate them from normal 'healthy' cells. A well-described trait of abnormal lymphocytes is an altered membrane composition with a high lipid content [2] and the fact that they have more apparent DNA when compared to normal lymphocytes, as they rapidly proliferate [3].

Sysmex XR-Series analysers take advantage of these special characteristics of the cell membranes in order to identify the cell, making use of specific channels and proprietary reagents. Combining the information from both measurement channels, WDF and WPC on XR-Series analysers makes it possible to differentiate between negative, reactive or suspected malignant cells [4].
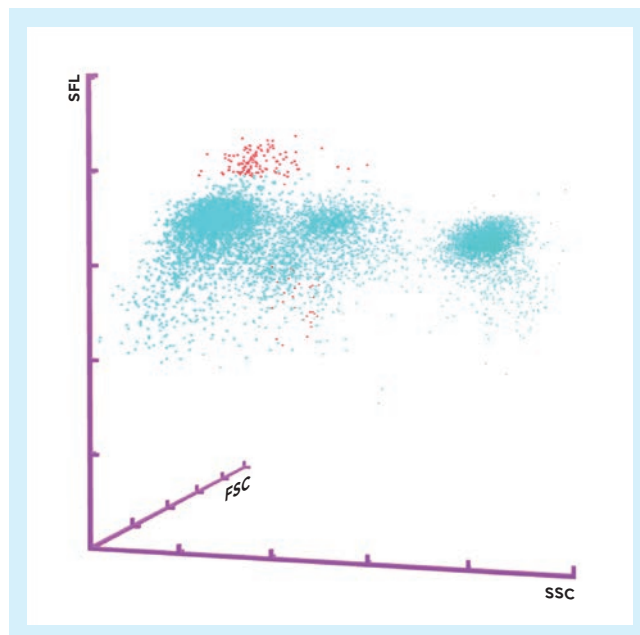

Fig. 2 WPC 3D scattergram showing abnormal lymphocytes.
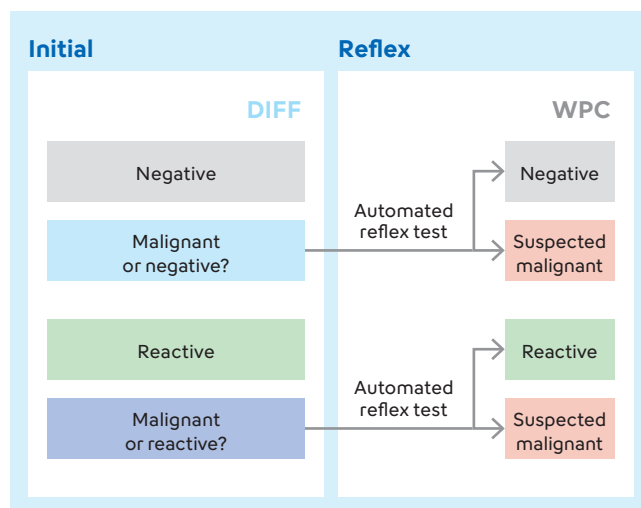

Fig. 3 The Sysmex analysers' dual-level approach to classify samples into three different, well-defined categories: negative, reactive (flag 'Atypical Lympho?') and suspected malignant (either flag 'Blasts?' and/or flag 'Abn Lympho?') [5].

References

[1] **Padala SA *et al.* (2023):** Diffuse Large B-Cell Lymphoma. Treasure Island (FL): StatPearls Publishing.

[2] **Gottfried EL *et al.* (1967):** Lipids of human leukocytes: relation to celltype. J Lipid Res. 8(4): 321–7.

[3] **Kawauchi S *et al.* (2013):** The Positions of Normal Leukocytes on the Scattergram of the Newly Developed Abnormal Cell detection Channel of the XN-Series Multi-parameter Automated Hematology Analyzers. Sysmex J Int; 23(1): 1.

[4] **Schuff-Werner P *et al.* (2016):** Performance of the XN-2000 WPC channel-flagging to differentiate reactive and neoplastic leukocytosis. Clin Chem Lab Med; 54(9): 1503.

[5] **Haematology white paper (2017):** Sensitive assessment of WBC functionality and greater workflow efficiency. Sysmex Europe SE; Last update: August 2023.